

IMPLEMENTATION TEAM MEETING NOTES

July 12, 2000, 9:00 a.m.-4 p.m.

NATIONAL MARINE FISHERIES SERVICE OFFICES PORTLAND, OREGON

I. Greetings, Introductions and Review of the Agenda.

The July 12, 2000 meeting of the Implementation Team, held at the National Marine Fisheries Service's offices in Portland, Oregon, was chaired by John Palensky of NMFS and facilitated by Donna Silverberg. The agenda for the July 12 meeting and a list of attendees are attached as Enclosures A and B.

The following is a distillation (not a verbatim transcript) of items discussed at the meeting, together with actions taken on those items. Please note that some enclosures referenced in the body of the text may be too lengthy to attach; all enclosures referenced are available upon request from NMFS's Kathy Ceballos at 503/230-5420 or via email at kathy.ceballos@noaa.gov.

Silverberg welcomed everyone to the meeting, led a round of introductions and a review of the agenda.

II. Updates.

A. In-Season Management. See Agenda Item IV.

B. Independent Scientific Advisory Board (ISAB). No ISAB update was presented at today's meeting.

C. Water Quality Team (WQT). No WQT update was presented at today's meeting.

D. System Configuration Team (SCT). No SCT update was presented at today's meeting.

E. Quantitative Analytical Report (QAR). No QAR update was presented at today's meeting.

III. Total Dissolved Gas Exchange in the Columbia River Basin (Management Tool).

Mike Schneider of the Corps' Waterways Experiment Station (WES) said the main purpose of this agenda item was to share some of the findings from the WES research into TDG exchange in the Columbia system. He described his involvement with the development of the management tool referenced in the heading of this agenda item, the Corps' System Model for Total Dissolved Gas (the SYS TDG spreadsheet model).

Schneider went through a series of slides, touching on the Corps' Dissolved Gas Abatement Study (DGAS), the modeling tools available at WES, the properties of dissolved gas in water, and the role of temperature in gas solubility. Schneider noted that the warmer the air and water temperatures are, the higher gas levels tend to be. He added that dissolved gas tends to concentrate in the surface layer of the water column; typically, if a pool of water is exceeding the 110% TDG standard, only 10%-20% of the water in the pool is actually in supersaturated condition.

Other highlights of Schneider's presentation included the following:

- The amount of air entrained into a spillway release is the first critical factor in TDG production. Spillways submerged below the tailwater elevation produce far less gas. Turbulence is another critical factor in TDG production; turbulence tends to be greater when flow deflectors are present, particularly at projects with deeper stilling basins. Turbulence re-suspends the gas bubbles and pulls them back down into the water column, rather than allowing them to rise to the surface and dissipate.
- The effects of powerhouse releases on TDG levels during spill events vary greatly from project to project; the interactions between powerhouse flows and spillway releases are extremely complex.
- Spill pattern and tailwater elevation are also critical factors in TDG production, as are bathymetry and total project head, water temperature and barometric pressure.
- Schneider conceded that it is likely that some structural and operational measures that would be effective in reducing TDG, from a strictly physical standpoint, would produce undesirable biological conditions.
- Tributary flow can be another critical factor in reducing TDG levels in a given reach, particularly below Chief Joseph Dam.
- Wind can also help reduce TDG levels in a reach; there is compelling evidence that prolonged periods of high wind produce significant degassing, reducing TDG levels by 6%-10% thanks to accelerated gas exchange at the water surface.
- The location of fixed monitoring stations in relationship to the TDG mixing zones can have a profound impact on the TDG levels recorded at a project. The current placement of the gauges

was established in the 1995 Biological Opinion; the intent was to locate these sites just below the mixing zone at each project. Schneider noted that there appears to be no consistency in the rationale for where these stations are sited; locating them in the spill water itself would provide much more information about what each project is contributing to TDG levels in the system. He suggested that it may make sense for the region to revisit the location of the fixed monitoring stations in light of the new information about how and where gas is produced in the system.

- The bottom line is that, while project operators can usually control factors like spill volume and pattern, tailwater elevation etc., factors outside human control, such as barometric pressure, wind and temperature, also have a profound effect on the TDG load at any given time.
- There are projects and reaches in the system where researchers have a very good understanding of the processes related to TDG production and dissipation, and others, such as Wells and Rocky Reach Dams, where much less is known about the dynamics of gas production.
- Schneider spent a few minutes going through the gas production characteristics of each project in the system; he noted that the perception that The Dalles Dam is not a gas producer is erroneous. A fair amount of gas is generated at that project, he said, although that production is moderated somewhat by the shallow depths below the project. The perception of The Dalles as a neutral gas-producer is probably due to the location of the monitoring station below that project, Schneider said.
- Various one- and two-dimensional models have been developed to predict gas levels in the system; the SYSTDG model has the ability to predict and forecast TDG pressures and project flows, to look at the potential effects of various operational and structural changes and to incorporate the influence of meteorological conditions. In other words, said Schneider, this spreadsheet model can look at a wide range of processes, and the influences of those processes on the levels of gas in the system. It also has the capability to be used for real-time spill management – if we go to 24-hour spill at a given project, what are the consequences downstream?
- The SYSTDG model includes empirical TDG relationships for each dam, specific to spillway releases. It can also estimate how much entrainment flow occurs between the spillway and powerhouse releases, a calculation that can be upgraded as more data becomes available.
- SYSTDG can estimate how much gas is produced at a dam, based on operations at that project; it then uses a simple routing technique to route that release through the pool to the next dam. It also takes into account degassing through wind effects, as well as any heating or cooling that occurs in that pool. Model input includes hourly data on spill, flow and total river discharge, stage of the forebay and tailwater, and temperature data. There is also an optimization routine that poses this question, said Schneider: if we want the system to meet a certain hydropower output in megawatt-hours, how can we best meet that power output while minimizing systemwide TDG production. The model will then calculate, or make recommendations, on the spill discharges that should occur at each project in the system, said Schneider.
- On a geographic scale, the current model boundaries include Dworshak Dam on the Clearwater River, Lower Granite Dam on the Snake, and Grand Coulee on the Columbia

down to the Camas/Washougal fixed monitoring station. The model is based on Microsoft Excel; results can be displayed graphically or in tables.

- At the model homepage, the user is required to specify the starting and ending date for each simulation, the physical reaches to simulate by upstream and downstream project, any model input parameters desired, and the type of model results (graphics or tables) desired.
- In response to a question, Schneider said it would be possible to ask the model to produce a simulation of 1996 conditions below Ice Harbor if the flow deflectors at that project had been in place at that time; what you would see, he said, is a significant reduction in dissolved gas production at that project.
- In response to another question, Schneider said some training in the use of the SYSTDG model may be necessary, if its full capability is to be achieved. It was suggested that some sort of workshop in the use of the model may be a good idea.
- The model is currently undergoing informal review by project sponsors; there has been some discussion of a more formal agency review, but there is currently no timeline for this review.

One takeaway message I got from Mike's presentation is that the IT may want to take a look at the current placement of the TDG monitoring instruments, said Silverberg – were there other action items that anyone else heard? The one point I wanted to re-emphasize was the role of factors beyond human control, said Schneider – at times, it now appears that compliance or non-compliance is going to be dependent on parameters such as temperature, wind and barometric pressure. I would certainly agree that monitor placement is a huge policy issue, said Michael Newsom – it's possible that we may need two sets of instruments, one to help us understand how a given project is behaving, and another to help us understand biological conditions in the system.

Where, then, does this go from here? Silverberg asked. It sounds as though there is some further review that needs to take place, before the SYSTDG model is distributed for public use, said Palensky – that's certainly something we can talk about at IT, TMT and WQT. It's likely that the Water Quality Team is the best forum in which to track the technical review of the model, he added. Rock Peters suggested that, given current funding constraints, if the SYSTDG model is to be taken to its next level of development, it will probably be necessary to develop a study plan for submission to the SCT's CRFM funding prioritization process.

I suspect that the IT will ultimately ask the WQT, once the review process is complete, to take a comprehensive look at the model and its applicability to biological concerns in the region; if the WQT feels it would be a useful management tool, we would ask them to coordinate its further development through IT and SCT, said Palensky. Any disagreement with the idea that IT would ask the WQT to give the model a thorough evaluation, then come back to IT with a recommendation? Silverberg asked. No disagreements were raised; it was agreed that, at the next IT meeting, the Corps will provide a report on the status of the review of the SYSTDG model, and the WQT will update the IT on the status of its evaluation. Palensky thanked Schneider for a very informative presentation.

IV. Reports on Potential Availability of Additional Water to Augment Summer Flows .

A. In-Season Management (TMT). Cindy Henriksen reported that the system is now in the summer operations period; final water supply forecasts have now been received. These forecasts have dropped significantly; the Grand Coulee January-July forecast went from 102% of normal in June to 97% of normal in July. At Lower Granite, for the April-July period, the forecast dropped from 85% of average in June to 79% of average in the most recent forecast. At The Dalles, the January-July forecast fell from 97% of average to 92% of average, a difference of 6 MAF.

Given this fact, said Henriksen, the current status of the projects is that some did not fill on June 30 as expected. One way to characterize current status is that some projects are passing inflow, some are filling slightly, and some are drafting. Basically, we're fully into summer operations mode, and considering what to do next, in terms of flow augmentation this summer. The spring flow target at Lower Granite for the April 3-June 20 period was 97 Kcfs; observed flow was closer to 85 Kcfs. At McNary, the spring objective was 260 Kcfs; observed flow was 243 Kcfs. At Priest Rapids, the spring flow objective was 135 Kcfs; observed flow was 157 Kcfs.

In terms of current status, summer flow augmentation has now begun from Dworshak and Brownlee Reservoirs, Henriksen said; both projects are currently drafting. Nengjin Liu of Idaho Power said the rate of draft at Brownlee was ramped up to 1.5 feet per day as of yesterday, yielding a Hells Canyon discharge of about 20 Kcfs. In response to a question from Jim Yost, Henriksen said current Dworshak outflow is 13.3 Kcfs. The 68-degree temperature standard in the Lower Granite forebay was exceeded on Saturday, July 8; Dworshak outflow was increased in response, up to the 110% TDG limit. Current outflow temperature from the project is 47-48 degrees F. In response to a question, Paul Wagner said the day-average temperature at Lower Granite forebay was 67.7 degrees over the past 24 hours, with a range of 66.5 degrees to 69.6 degrees. Current flows at Lower Granite are 42.5 Kcfs, he added.

Henriksen said there have been some questions within the Corps about why flows are so low, currently; she noted that unregulated inflow to projects basinwide dropped well below average in May, and has continued on that trajectory ever since. The water supply forecast was far greater during the early spring period, said Henriksen; we did not foresee that June inflows would continue to recede. Normally we would expect much more precipitation than we saw this year in May and June, she said; it now appears that Libby, for example, will achieve only elevation 2436 on July 31. Libby has to be at elevation 2439 feet by August 31, she said, hence the smaller-than-expected volume available for salmon flow augmentation from that project during the late-summer period.

Given the trend we've seen this year, said Wagner, is it fair to assume that the forecast flows in the spreadsheet for the rest of the summer period are probably optimistic as well? I wouldn't characterize the weekly spreadsheet as optimistic, Henriksen replied – each week, it's based on the best information the River Forecast Center can give us. I think what Paul is saying is that, each week, as we've gone through the season this year, the news has gotten worse, said Litchfield. The question I

have is whether we have narrowed the range by which the forecast can deteriorate, given the point we're at in the season, or could it still get a lot worse? Palensky asked. We could still see faster recession of the summer base flow, Henriksen replied – I don't think that's totally out of the question. The reduction in water supply forecast from June to July is probably outside the normal error bands, she added; the forecast can go either way, as we saw in the spring of 1998, when the May final water supply forecast was 84% or normal, and we ended the season at 98% of normal, thanks to a huge amount of precipitation. Daley said there is some concern, within BPA, that the current spreadsheet may be significantly optimistic in its assumptions of outflow from the Canadian projects.

B. Hungry Horse and Libby. Litchfield said that, as Henriksen had reported, Libby Reservoir is tapped out – we'll be lucky if we can maintain 8 Kcfs outflow through the rest of the summer, as we'd planned, he said. The situation has created a large numbers of problems at that reservoir, said Litchfield. Hungry Horse is another story; there is storage water available there, and with NMFS' help, we're trying to put that project on a steady outflow that will allow it to achieve the full 20-foot draft by August 31. Going for more than a 20-foot draft, however, isn't in the cards – the state would like to draft the project less than 20 feet, but they understand that, in a poor water year like this one, the full Montana contribution is required. No additional water, however, is available in Montana, Litchfield said.

C. Dworshak, Brownlee, Albeni Falls, the Upper Snake. Jim Yost said there have been various requests, over the past several years, for additional water from Idaho; our response this year is the same as it's been in the past, Yost said. You can ask for the water, but Idaho law says you're only going to get 427 KAF for salmon flow augmentation, plus the Idaho water. There isn't any more water available, said Yost; even if there was, you wouldn't be able to get it out, because that would be a violation of Idaho state law. In addition, he said, if the Owyhee or any other tributary of the Snake River provides additional water, we will subtract that from the 427 KAF, he said.

D. Grand Coulee and Banks Lake. Jim Nielsen said that, at Grand Coulee, there is little or no support for drafting the project below elevation 1280 this year. Grand Coulee will not refill in 2000; the highest elevation it is likely to achieve is 1287, three feet from full. The Spokane Tribe has made it clear that, if for any reason the lake is drafted below elevation 1280, the federal government will have to pay for additional cultural protection actions, Nielsen said; the National Park Service is also unwilling to allow the project to be drafted any lower than elevation 1280.

At Banks Lake, said Nielsen, there is limited support for an operation similar to the one implemented in 1998, with the exception of the Colvilles, who again are concerned about effects on cultural sites. There are also concerns about navigation hazards if the lake was drafted in August, Nielsen said; still, again, there is limited support for the possibility of drafting Banks Lake five feet in August. This would provide about 75 KAF for additional flow downstream, he added. Henriksen said this will provide about 2 Kcfs of additional flow from Grand Coulee during the month of August.

E. Owyhee Reservoir. Christine Mallette said Oregon is continuing to explore the possibility of identifying additional sources of water; recently, they have been contacting the managers of various irrigation companies in eastern Oregon, and have encountered no willingness to sell water from storage at Owyhee Reservoir. Owyhee never refilled, she added, and is currently only about 69% full. There is apparently no interest in selling storage water from Phillips Reservoir on the Powder River, as well, said Mallette. Daley suggested that, since Oregon has been very active in seeking additional water in other states, it may be time to involve the Oregon Governor's office in the effort to find additional water within Oregon itself.

F. Canadian Reservoirs. Daley said there will be no Libby/Arrow swap in 2000. He said BPA had sent a letter to B.C. Hydro, asking about the possibility of obtaining additional water from Canada; their response was the same as it has been in each of the past three years when we've made this request – essentially, that any additional Canadian outflow has to be of benefit to Canada and to B.C. Hydro, and they don't see any such benefit this year.

In other words, said Daley, B.C. Hydro would need to be able to show that any additional releases from Canadian storage would be beneficial to Canadian citizens. The way Bonneville would need to approach this, in the future, is to look to the possibility of providing additional turbines at Canadian projects, additional transmission capacity and other inducements – things which, in other words, would provide benefit to Canada. Those kinds of arrangements will take several years to implement, said Daley; however, Bonneville is talking to B.C. Hydro, and will continue to do so.

It sounds, then, as though, in the hunt for additional water, the only possibility is the additional volume from Banks Lake, said Silverberg. Is there any expectation that the excellent power market this summer will cause additional water to flow from the headwater storage projects in Canada? Paul Wagner asked. I wouldn't expect that to occur, Daley replied.

V. Identification and Supporting Rationale for a “Best Shaping Plan” for Summer Flows at Lower Granite and McNary Dams.

Wagner said the shaping plan has been discussed at FPAC; the expectation, for this year, is that most of the water will be shaped into the next five weeks. Flows toward the end of August are likely to be so low that placing an emphasis on trying to increase them is unlikely to be the best use of the available resources this year, he said – the majority of the listed Snake River fish pass through the system by the first two weeks in August. Most of the shaping will take place at Grand Coulee, given the fact that Libby, Hungry Horse and Dworshak are essentially on fixed operations. Grand Coulee operations will be discussed week-to-week at TMT, he added.

VI. Current Status of 2000 FCRPS Biological Opinion.

Palensky said that, as everyone at IT is aware, the release of the Biological Opinion has been

somewhat delayed; I assure you that is not due to lack of efforts on NMFS' part, he said, as the people in this office have been working nights and weekends to get the BiOp finished. We're still targeting the end of July for the BiOp's release, Palensky said; to the best of my knowledge, that is a hard and fast date. The issue for the IT is, what do you want to do once the BiOp is released? Palensky said. As you're aware, agencies and tribes will have a 30-day review period; do we want to put it on the IT agenda for August 2, or would it be preferable to schedule a second meeting around mid-August, specifically to go through the BiOp and answer questions? Both, Litchfield replied. It was agreed to plan the special IT meeting for August 16.

VII. Approval of Minutes from June 7 IT Meeting.

No comments were provided at today's meeting.

VIII. Next IT Meeting Date.

The next meeting of the Implementation Team was set for Wednesday, August 2, from 9 a.m. to 4 p.m. at NMFS' Portland offices. A second meeting, to discuss the 2000 FCRPS Biological Opinion, was tentatively set for Wednesday, August 16. Meeting notes prepared by Jeff Kuechle, BPA contractor.